Euphonix SH612 Studio Hub User Guide

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Euphonix

digital emotion

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Chapter 1: Getting Started

1.1   Introduction to the SH612

The SH612 Studio Hub is a TDM signal router using MADI connections to route 672 inputs and 672 outputs. It supports 56 channels at 48 kHz on each MADI port, or 28 channels per port at 96 kHz sample rate, and outputs any input MADI port to any output port.

For System 5 and Max Air console installations, the SH612 provides the central point from which to send and receive MADI signals. In these installations, each SH612 is configured and installed by Euphonix, so you will not often need to modify most of its parameters. The console has built-in routing control for the Studio Hub. For console system hookup, see your console's *Technical Overview* document in your manual binder.

The SH612 can also operate as a standalone MADI router and as an ES Control capable router for use with video routing systems. For these applications, all functions can be controlled from the front panel, or through the standalone Route Manager application or ES Control capable video router.

1.1.1   Features

The SH612's sync sources, sample rates, and sample rate modes are listed in Table 1-1.

Table 1-1 SH612 Features

Sync Sources	Sample Rates	Sample Rate Modes
Word Clock	44.1 kHz	Output a specific sample rate
AES	48 kHz	Lock the system to an external sample rate
Blackburst or Composite video	88.2 kHz	Derive the sample rate from a lower resolution signal (i.e., LTC, MTC, or Video)
VITC, LTC, MTC	96 kHz	
Internal	Pull-Down and Pull-Up versions of each rate as well as custom rates in the range 31–100 kHz	

If necessary, the SH612 can distribute synchronization signals via four AES Sync (AES/EBU), Word Clock, video, or MTC outputs to System 5/Max Air components. The SH612 can generate or lock to Time code, or convert between different formats. All standard time code rates are supported:

- **Film**: 24 fps
- **PAL/SECAM**: 25 fps
- **Color NTSC**: 29.97 (drop and non-drop)
- **black and white video** rate
- **MIDI sequencers**: 30 fps (drop and non-drop)

NOTE: *Euphonix does not recommend using the SH612 for synchronization distribution. System 5 and Max Air installations should use synchronization distribution amplifiers with separate sync lines going to each component (no looping). Please see the synchronization notes in your console's install guide.*

The SH612 routes digital audio via 12 MADI In and 12 MADI Out ports, each with the capacity to receive or transmit up to 56 channels (up to 24-bit, 48 kHz). For sample rates exceeding 50 kHz, each MADI channel can carry only 28 digital audio channels.

The MADI spec allows 64 channels of audio per port - however, Euphonix' VariSpeed technology occupies some of this bandwidth and thus each port supports 56 channels at 48 kHz.

1.1.2   Power On Sequence

Attach the provided IEC-compatible power cables to the two IEC inlets. Connect the other ends to wall outlets with appropriate plug adapters if necessary. The SH612 power supply automatically adjusts to any voltage in the range 110–240 V.

We recommend powering up the SH612 before the digital devices to which it is connected. The SH612 conducts a brief self-test routine upon power-up and displays the firmware revision number. When the Main Menu is displayed, power up the attached devices.

NOTE: *For console installations, please refer to the power up routine for System 5/Max Air before attempting to power the DF64 Digital Frames and the Pilot Computers.*

1.2   Modes of Operation

The SH612 has two main standalone modes of operation, with different firmware loaded for each. The firmware can be flashed in the field if the other mode is desired (typically it is decided on ordering and the firmware is uploaded at the factory). The two modes are as follows:

Standard Operation

The SH612 acts as a standalone routing hub for all MADI sources/destinations. Using the standalone MADI routing application, routes in and out of the Studio Hub can be created, saved, and recalled as necessary. For more information, see page 19.

ES Control

With the ES Bus capable firmware (the second bootup screen shows *ES-Control Equipped Edition*) the SH612 can be controlled by various video routing systems using the standard ES Bus serial protocol. This negates the need for a separate audio router for the video routing system, useful in situations with limited space and weight considerations (OB trucks, small studios, etc). Integration for each video routing system is documented in its own chapter - see the table of contents.

1.3   Setting the Control Port

For both modes, the SH612 must be set to read control messages from its female DE-9 Control port (RS-422 serial), instead of its IEEE-1394 ports (previously used for the now-discontinued Euphonix R-1 recorder).

First disconnect all cables from the Control and IEEE-1394 ports (the unit does not allow Control port settings modifications with cables connected, to avoid accidental changes). Then proceed as follows:

1. Power on the SH612 and press **Select** once to enter the Main Menu.

    If the SH612 does not display its Main Menu, press the **Escape** key several times until the status display is shown, then press **Select** again.

2. Turn the **SpinKnob** to highlight Utility Menu and press **Select**.

3. Turn the **SpinKnob** to highlight **Control Port** and press **Select**.

4. Check that the LCD displays **Control Port = RS422** at the top. It not, turn the **SpinKnob** to highlight **RS422** (at bottom of LCD) and press **Select**.

5. Press **Escape** twice to show status again.

6. If you changed the setting, reboot the SH612 to implement the control port change.

7. Reconnect the control cables.

Chapter 2: Front and Rear Panel Interface

2.1   Front Panel
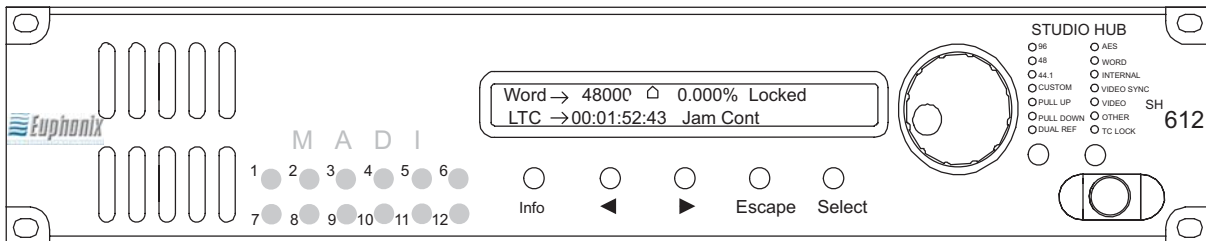
Figure 2-1 SH612 Front Panel

2.1.1   LCD Display

The LCD window uses two lines of 40 characters to display the status of current settings or the menu system.

Status Display
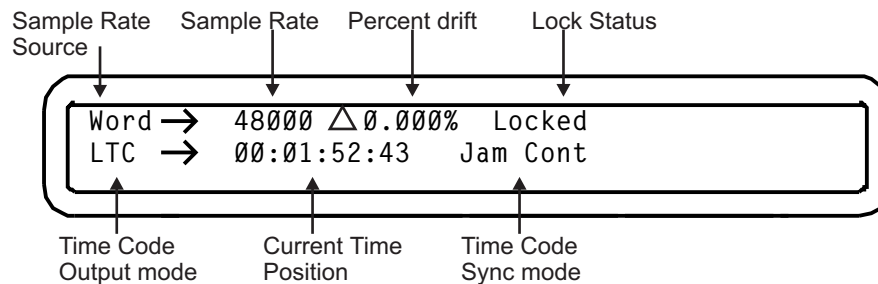
Figure 2-2 LCD Display

Menu Display

The Menu system has the following hierarchy:

Menu -> Submenu -> Parameter -> Parameter Value

Menu name

Indicates submenus are
available for scrolling with
arrows or SpinKnob

```
Main Menu - Use Spin Knob to Select
Time Code Setup Menu                    ↓ ←→
```

Submenu name, parameter, or value   Press **Select** to view submenu contents
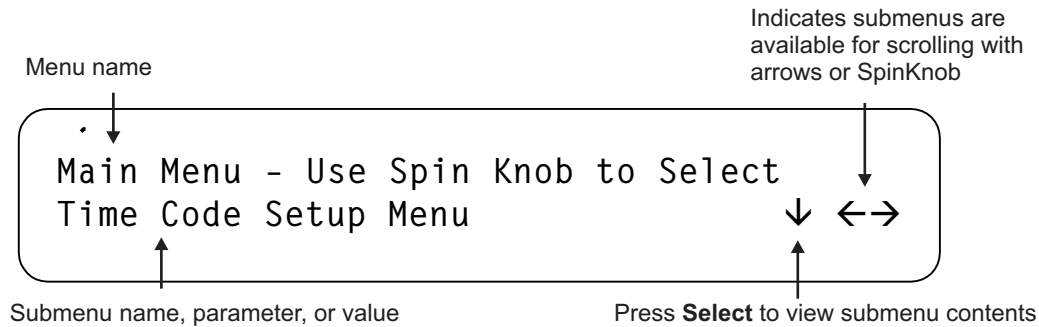
Figure 2-3 LCD Menu Display

2.1.2   Menu Controls

Six front panel controls interface to the menu system:

Info   ◄   ►   **Escape**   **Select**

Figure 2-4 Menu Controls on Front Panel

Info

Press **Info** to display the current firmware version.

Arrow Keys

The arrow keys do one of the following three things depending on the context in which
they are used:

- Scroll through menus and parameters
- Move the cursor through display fields
- Adjust parameter values

Escape

Press the **Escape** key to:

- move one menu level up;
- move from the Main Menu to the Status Display;
- cancel the current operation (but not previous selections).

Select

Press the **Select** key to:

- enter the menu system from the status display;
- display a submenu or parameter from a list;
- display parameter values;
- select the highlighted parameter value.

The menu display automatically reverts to the status display 15 seconds after the last menu action.

SpinKnob

The **SpinKnob** performs almost identical functions to the arrow keys, except when the display includes multiple fields that can be adjusted, in which case the arrow keys position the cursor and the **SpinKnob** sets values.

The **SpinKnob**:

- scrolls through the display fields, menus, submenus, parameters, and values;
- adjusts parameter values.

Rotate the **SpinKnob** clockwise to:

- increase the numeric value;
- move down through a list of menus, parameters, or values;
- move the cursor to the right across the display.

Rotate the **SpinKnob** counterclockwise to perform the inverse function of those listed above.

2.1.3   Sample Rate Controls/Indicators

The front panel has two keys dedicated to the **Sample Rate Source** and **Sample Rate** settings, and 14 LEDs that display their status. Since these controls and indicators are so frequently used, they have been included on the front panel for convenience without requiring access to the Menu tree (although they are available in the menus).

Sample Rate Source Key

Press the **Sample Rate Source** key to display the Sample Rate Source menu. Use the **SpinKnob** or arrow keys to highlight the appropriate Sample Rate Source value. Press **Select** to activate the displayed value and revert to Status Display mode. The LED corresponding to the selection illuminates.

Sample Rate Key

Press the **Sample Rate** key to display the Sample Rate menu. Use the **SpinKnob** or arrow keys to highlight the desired Sample Rate setting. Press **Select** to activate the displayed value and revert to Status Display mode. The LED corresponding to the selection illuminates.

○ 96   ○ AES

○ 48.0   ○ Word Clock

○ 44.1   ○ Internal

○ Custom   ○ Video Sync

○ Pull-Up   ○ Video

○ Pull-Down   ○ Other

○ Dual Ref   ○ TC Lock

Sample Rate   Sample Rate Source
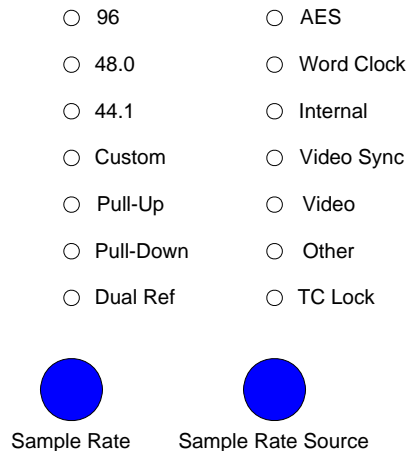
Figure 2-5 Sample Rate LEDs and Buttons

Sample Rate LEDs

96, **48**, and **44.1** (kHz) represent the nominal sample rates. The **Custom** LED illuminates to indicate other rates within the range 31–100 kHz.

The **Pull-Up** or **Pull-Down** LEDs illuminate when the sample rate is set to a Pull-Up or Pull-Down rate of one of the three nominal or Custom rates.

The **Dual Ref** LED illuminates to indicate that the time code and sample rate clock sources for the SH612 each reference a separate external signal. This means that synchronization must be accomplished externally to the SH612 or the signals may drift. The SH612's response to drift varies depending on the mode. Drift is allowed in the **Jam Continuous** (1% only) and **Jam Once** modes. It is only in either of these two modes that the **Dual Ref** LED lights. In all other cases the LED is not lit.

The **TC Lock** LED indicates time code lock status:

- Solid LED: Locked to valid time code signal

- Flashing LED: No lock because expected time code signal not present

- Unlit LED: SH612 is generating internal time code

2.1.4   MADI Indicators

Twelve back-lit buttons indicate the MADI input channel status.
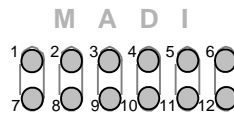
Figure 2-6 MADI Buttons

Each button corresponds to the physical MADI input/output port of the same number. The SH612 software detects the physical MADI ports connected upon startup and continuously monitors all MADI input ports to detect valid MADI signals. If the SH612 detects MADI input port activity, it lights the corresponding key (bright-solid). If MADI signal activity is not detected or is not valid, the key lights dim-solid.

Press any of the 12 buttons to view and edit the patch configuration for the corresponding MADI port in the display (Edit Route mode).

2.2   Rear Panel Connectors
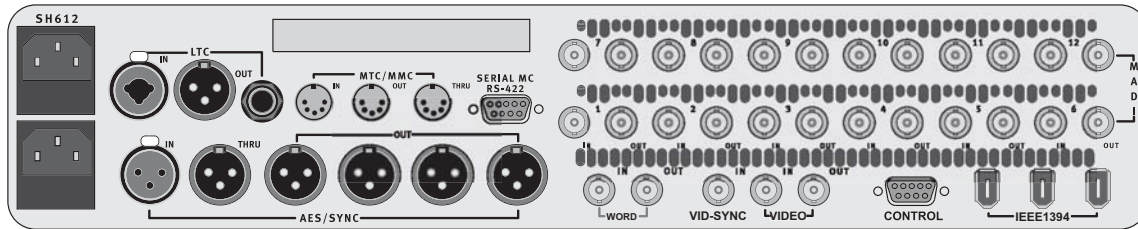
Figure 2-7 SH612 Rear Panel

AES Sync In (female XLR): Connect to house AES Sync source.

AES Sync Out Ports (four male XLR): Outputs AES Sync. These outputs are for convenience only. All major components of the System 5 and Max Air consoles should be fed synchronization from a distribution amplifier with separate sync lines for each. See your install guide for more information.

Word In (BNC): Connect this port to the house Word Clock source.

Word Out (BNC): Provided for convenience. The Word Clock output is always locked to the selected sync source. Typically, MADI Converters located more than 50 ft from the Studio Hub use Word Clock instead of AES Sync. Word Clock should be fed from the system distribution amplifier. See your console install guide for more information.

**MADI In / Out Ports** (24 BNC) Digital audio in and outs. These connect to the Euphonix MADI Converters or to your MADI sources/destinations. For console installation, see the MADI Hookup diagrams in your console's *Technical Overview* document.

Vid-Sync In (BNC): The Vid-Sync In port can accept blackburst or composite video as a master clock signal. No output occurs at the Video Out port when using this port.

Video In (BNC): The Video In port can accept blackburst or composite video or anything with VITC embedded as a master clock signal. The signal input to Video In port is sent through to the Video Out port. VITC delivered to the input or internally created can be routed to Video Out.

Video Out (BNC): Outputs VITC time code when a video signal is present at the Video In port.

Control (female DE-9): Use this RS-422 port for software control of the SH612 from System 5/Max Air, a configuration PC (standalone routing), or Jupiter/Pro-Bel/PESA/ nVision video routing systems.

IEEE 1394 ports (6-pin): Use this IEEE 1394 high-speed communication protocol for software control of the SH612 from the discontinued R-1 recorder (not for System 5 or Max Air.

Serial MC RS422 (female DE-9): Input port for Machine Control signals. Not used in System 5/Max Air.

MTC/MMC In (5-pin DIN): Input port for MIDI Time Code or MIDI Machine Control signals.

MTC/MMC Out (5-pin DIN): Output port for MIDI Time Code or MIDI Machine Control signals.

MTC/MMC Thru (5-pin DIN): Duplicates the signal applied to the MTC/MMC In port.

LTC In (1/4" phono and XLR): Input SMPTE LTC.

LTC Out (1/4" phono and XLR): Generates SMPTE LTC at the time code frame rate set by the System 5 software.

Power Connectors (IEC): Accepts two standard IEC power cords (provided). Two autoranging switching supplies accept voltages between 100–240 VAC, 50–60 Hz.

Power Status (DE-9): Offers two open-collector, optically-isolated power status feeds. Pins 1/2 reference the primary power supply, and pins 3/4 the secondary. The feeds switch a maximum of 20 mA at 24 VDC.

Chapter 3: Standalone MADI Routing

This configuration requires an SH612 with non-ES firmware loaded (check that the firmware version number displayed on the LCD at startup does not have "ES" after it). This is the standard mode of operation for the Studio Hub.

3.1   Connections

If you have not done so, first check that the SH612's Control port is set to **RS422**. See page 9. Then to enable control of the SH612 from the configuration PC:

1. Connect one end of a 9-pin straight-through serial cable (DE-9 connector) to the SH612 Control port.

2. Connect the other end of the cable to an RS-422 to RS-232 adapter. The RS-422 end of the adapter should be connected to the cable.

3. Connect the RS-232 end of the adapter to the configuration PC serial port. (You may need a female to female RS-232 adapter

3.2   Route Manager

This section discusses the standalone SH612 Route Manager application. Using the Route Manager is a three step process represented by three tabs (across the top of the interface) to expose editing pages.

Open the Route Manager application by double-clicking on the **Route Manager** application icon on the Windows desktop.

Three tabs at the top of the router access different functions:

*   **Configurations and Patches**: store MADI configurations and routes.
*   **Routing**: build or change signal routing to and from each MADI device.
*   **Edit Current Configuration**: define hardware types, number of Decks, Converters and Hubs.

3.2.1   Configuration and Patches

Begin by selecting the **Configurations and Patches** tab and make a new configuration in the Configuration window. Several configuration types are available in the **New** menu. Activate your configuration by double-clicking it or selecting it and pressing the **Open** button. It is active when it has a red check mark next to it. Then use the Patches window to create and name a new patch.
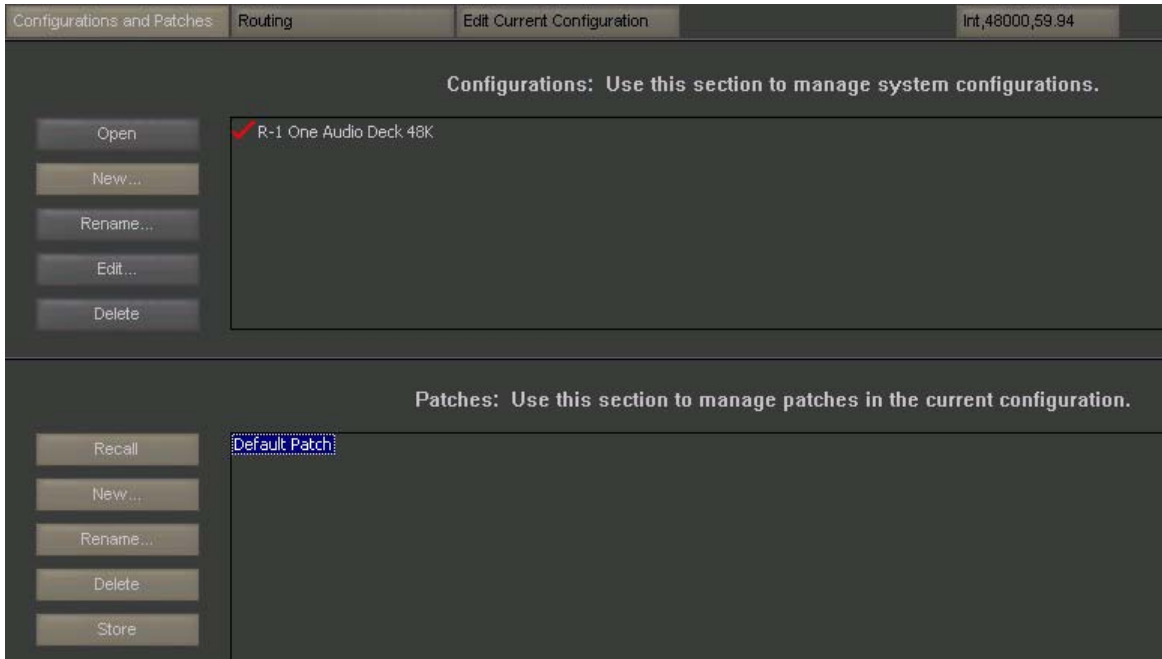
Figure 3-1 Configuration and Patches tab

- **New:** creates a new blank patch.
- **Recall**: activates the selected patch.
- **Store**: stores the patch settings.

Select the **Edit Current Configuration** tab. The following buttons are available:

- Add Device
- Rename Device
- Remove Device
- Declare Connection
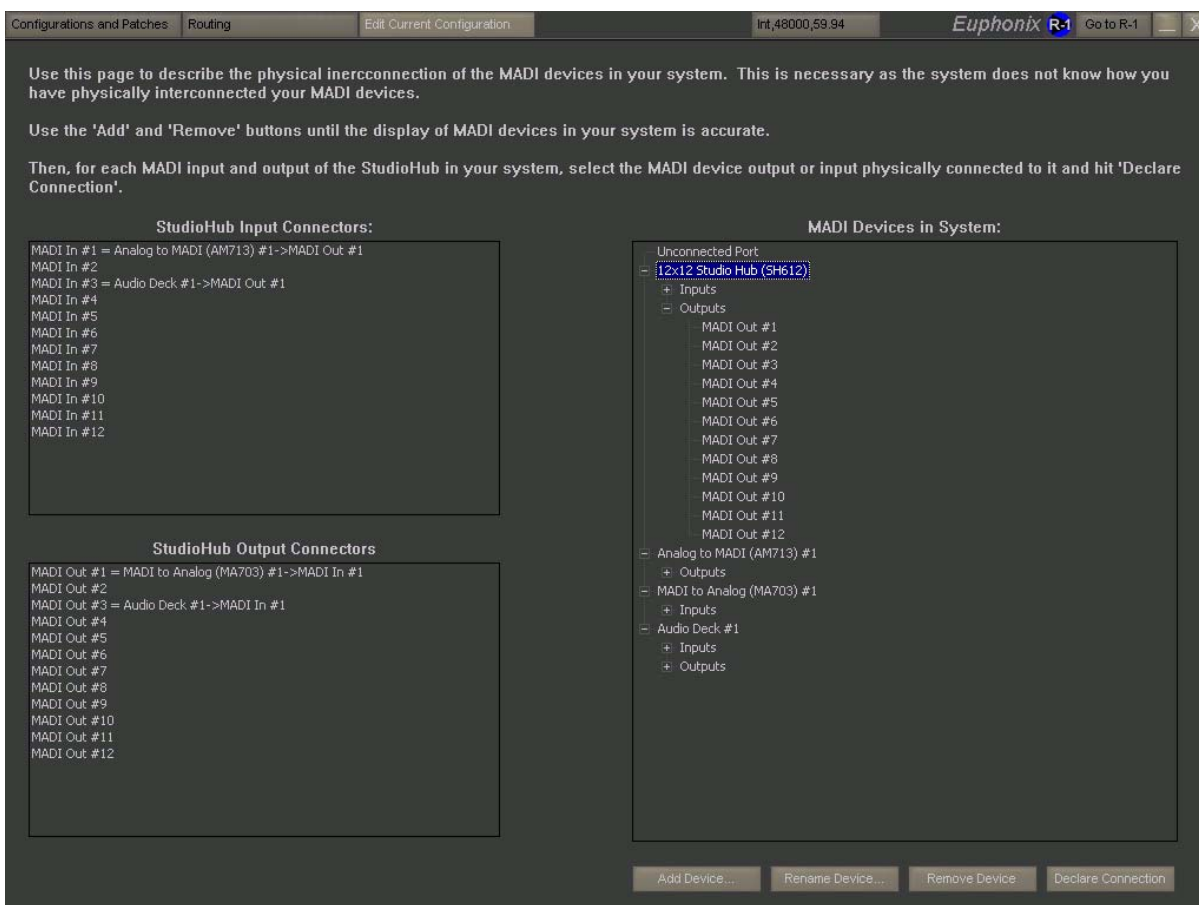
Figure 3-2 Edit Current Configuration tab

Under the heading **MADI Devices in System**, make sure all the system components are listed and that the Studio Hub is the correct size. Remove unwanted components by highlighting them and clicking the **Remove Device** button. Add a component by clicking the **Add Device** button and selecting the device from the list.

Define the MADI port interconnection for each device in your system.

Example:

1. Under **Studio Hub Input Connections**, select **MADI In #1**.

2. Under **MADI Devices in System**, select the **MADI Out #1** of the Analog to MADI Converter (AM 713)#1.

    Expand the listed component to see the types of connections available. For example, click the + next to Audio Deck to expand its Inputs and Outputs. Expand the Outputs to see there are two outputs to choose from.

3. Click on the **Declare Connection button** to solidify the connection.

Example:

1. Under **Studio Hub Output Connections**, select **MADI Out #3**.

2. Under **MADI Devices in System**, navigate to and select the **MADI In #1** of the Audio Deck #1.

3. Click the **Declare Connection** button to solidify the connection.

To erase a connection, select **Unconnected Port** in the **MADI Devices in System** window and then click the **Declare Connection** button.

3.2.2   Creating Custom Routes

The **Routing** tab has Signal Sources and Signal Destinations areas.
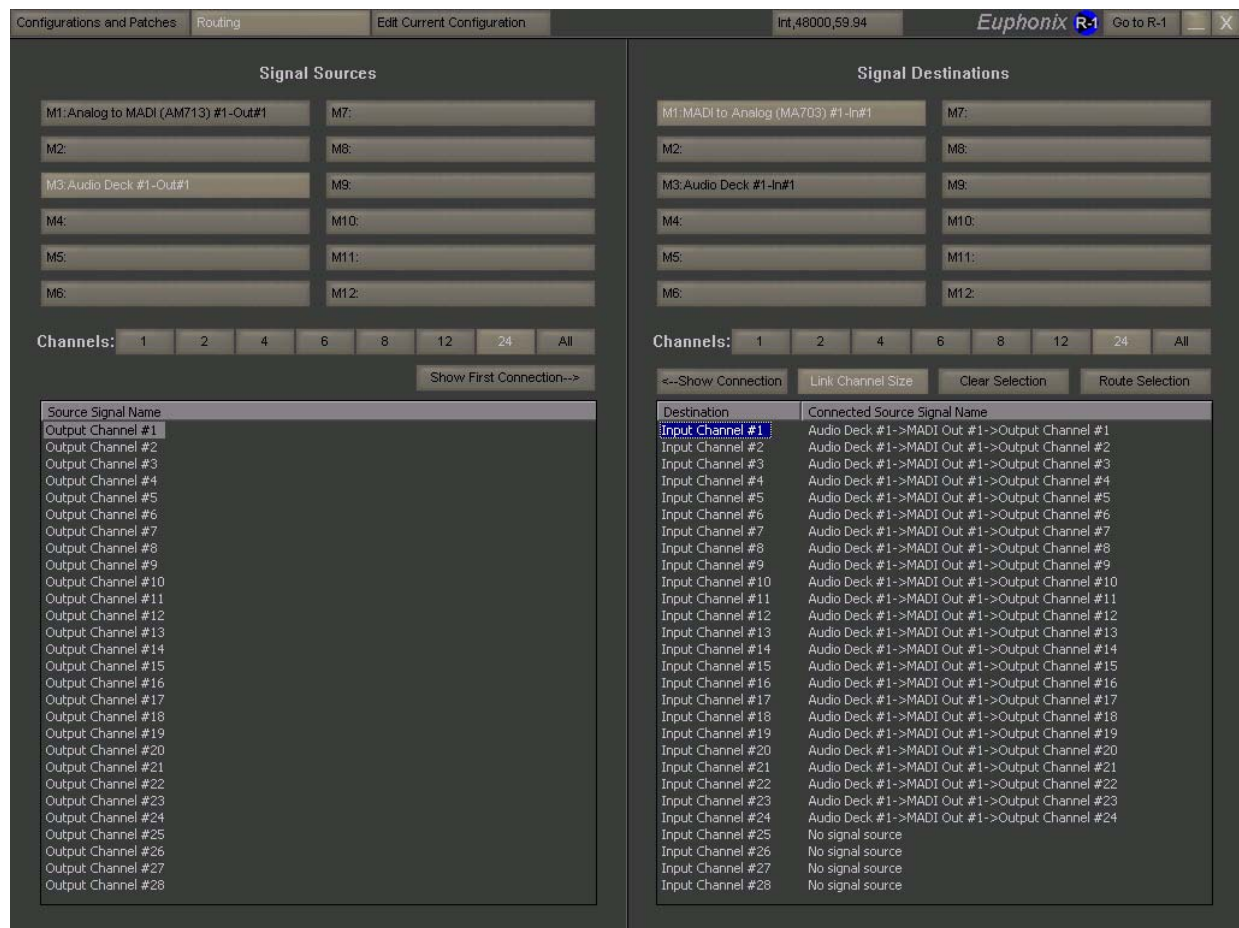
Figure 3-3 Routing tab

To create a route:

1.   Select the Signal Source device to Route from.

     The device's outputs are displayed in the window below.

2.   Select the Signal Destination device to route to.

     The device's inputs are displayed in the window below.

3.   Select the output channel from the Signal Source and the input channel from
     the Signal Destination.

4.   Click the **Route Selection** button to make the connection.

Save this new route as a new Patch as described below.

•   You can route banks of 2, 4, 6, 8, 12, 24 or all channels by using the channel
    width buttons. You can also link the channel size selection with the **Link
    Channel Size** button.

•   To clear a route, select the input channel to reset and click the **Clear Selection**
    button.

•   All changes to a route are immediate and there is no undo function.

3.2.3   Saving Patches

Once your MADI connections have been defined, you must save your settings.

1.   Select the **Configurations and Patches** tab.

2.   Select your Patch.

3.   Press the **Store** button.

To recall a Patch for viewing, editing, or activation in the Studio Hub, select the desired
Patch and click the **Recall** button.

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Chapter 4: Integration With Jupiter VM3000 Routers

The SH612 with ES-Control firmware can be controlled by the ES-capable Thomson Grass Valley Jupiter. This chapter details integrating the SH612 with the Jupiter.

Make sure your SH612 has the ES-Control firmware by watching for *ES-Control Equipped Edition* and the firmware revision (with *ES* after the number) on the second bootup screen on the LCD display when turning on the SH612.

Your Jupiter system must have the **ES Bus Router Control** and **Third Party Router Control Unrestricted** options enabled. If these are not installed, contact Thomson Grass Valley to obtain them. Without these options, the Jupiter does not have the capability to control the Studio Hub.

NOTE: This chapter assumes you have an installed Jupiter router system and are trained to use it. If you are new to the Jupiter system, consult its documentation and familiarize yourself with its operation before proceeding with this section.

4.1   Connections and Basic Setup

We recommend installing the SH612 in the same rack as the Jupiter VM3000 control board to minimize cable length and make checking configuration and communication between the two devices easier.

For the SH612 to receive and acknowledge commands from the VM3000, the Control Port must be set to **RS422** (see page 9 for instructions). Make sure to cycle the SH612's power off/on after resetting the Control Port.

NOTE: Make sure no control cables are connected to the SH612 or the following procedure will not be possible.

1. Enter the MADI Routing menu using the SpinKnob.

2. For each MADI port, switch it to **Non-Audio Deck** and press **Select** to confirm the selection.

3. Connect an RS-422 cable (9-pin, male-to-male, straight-through) between the SH612's **Control** port (bottom-right of the rear panel) and the Jupiter's **Serial** port.

   The VM3000 has eight Serial ports configured in pairs, 1/2, 3/4, 5/6, and 7/8.

4. Delegate one pair for the SH612.

   Do not connect anything to the other port in that pair except another SH612.

4.2 Jupiter Configuration

This section assumes you are familiar using the Jupiter Network Suite and Jupiter Configurator applications to edit Jupiter configuration sets. The examples and figures in this section document a basic configuration set with only the options necessary for the SH612 and VM3000 to work together.

NOTE: *As the Jupiter manual suggests, we recommend adding rows to the end of the data tables, instead of inserting them in the middle, to reduce the risk of creating problems in a working setup.*

To configure the Jupiter to control the SH612, open the Jupiter Configurator by opening the Jupiter Network Suite, click the **JNS Tools** button at the top, and click **Configuration Editor**. Then edit the configuration tables as described in the following sections (each of which is an entry in the **Jupiter** menu of the Jupiter Configurator).

4.2.1 Serial Protocol

1. Configure the protocol for the port pair to which you connected the RS-422 cable from the SH612 to be **ESC** (**ES-Control)** by selecting it from the dropdown menu.

   Do not use **ES-Bus, ES-Physical**, or **ES-Switch**.

	Board	Protocol 1/2 - (CM 1)	Protocol 3/4 - (CM 2)	Protocol 5/6 - (CM 3)	Protocol 7/8 - (CM 4)	Protocol 9/10 - (CM 5)
1	VM-Eupho	MPK (MPK)	MPK (MPK)	MPK (MPK)	ESC (ES-Control)	UND (U...

Figure 4-1 Jupiter Serial Protocol dialog

2. The baud rate for the port pair should be automatically set to 38400 when **ES-Control** is selected. If not, select **38400** from the **Baud 7/8** dropdown menu.

3. When finished, click **Apply** and then **Close**.

4.2.2   Switcher Description

1. If switchers have already been added, right-click and select **Add rows to bottom**.
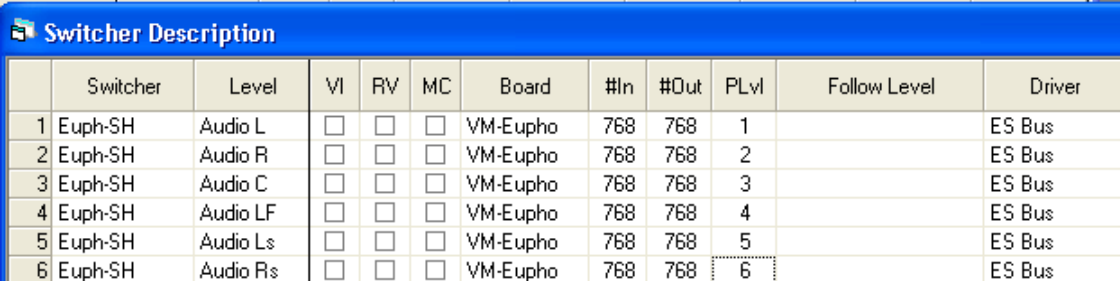
The **Add rows to bottom** dialog appears.

2. Enter the number of levels to add for the SH612 in the **Rows to Add** field.

This is typically 4-6 but depends on your sources. Add the maximum number that any one source or destination requires.

3. Click **OK**.

The empty rows appear at the bottom.

	Switcher	Level	VI	RV	MC	Board	#In	#Out	PLvl	Follow Level	Driver
1	Euph-SH	Audio L	☐	☐	☐	VM-Eupho	768	768	1		ES Bus
2	Euph-SH	Audio R	☐	☐	☐	VM-Eupho	768	768	2		ES Bus
3	Euph-SH	Audio C	☐	☐	☐	VM-Eupho	768	768	3		ES Bus
4	Euph-SH	Audio LF	☐	☐	☐	VM-Eupho	768	768	4		ES Bus
5	Euph-SH	Audio Ls	☐	☐	☐	VM-Eupho	768	768	5		ES Bus
6	Euph-SH	Audio Rs	☐	☐	☐	VM-Eupho	768	768	6		ES Bus

Figure 4-2 Jupiter Switcher Description dialog

4. Enter a Switcher name in each new row.

We suggest SH612 or something similar to remind you what those levels refer to. You must put in the same switcher name or the switching will not work properly.

5. Enter names for the new Level fields.

6. For the two audio levels, enter 768 in the #In and #Out fields.

NOTE: *The SH612 reserves bandwidth on the MADI bus to enable Varispeed operation, and thus carries 56 connections per MADI port instead of the 64 allowed in the MADI specification. The SH612 has 12 MADI ports so there are 56 * 12 = 672 ins/outs available. Since the Jupiter assumes 64 per port, this discrepancy must be taken into account when setting up switcher inputs/outputs. See next section.*

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7. Enter PLvl values for each logical level.

Choose three unused Plvl numbers; the exact numbers do not matter.

8. In the Driver field for each level, select **ES-Bus** from the drop-down menu.

This example created a switcher named **Euph-SH** with six levels for 5.1 sources, although each input and output device does not require all the levels created.

9. When finished, click **Apply** and **Close** to close the dialog.

4.2.3   Switcher Input

1. If you have multiple switchers, select **Jupiter->Switcher Input** in the Configurator.

This displays a dialog to choose which switcher to edit.

2. Click the switcher added in Switcher Description above to describe the SH612.

3. Press **OK**.

The Switcher Input dialog opens.

	Logical Input Name	Audio L	Audio R	Audio C	Audio LF	Audio Ls	Audio Rs
1	VT01	000	001				
2	VT02	002	003				
3	VT03	004	005				
4	VT04	006	007				
5	VT05	008	009				
6	CAM01	010	065				
7	CAM02	064	067				
8	CAM03	066	069				
9	CAM04	068	071				
10	HD01	072	073	074	075	076	077
11	HD02	078	079	080	081	082	083

The name of a logical input. Changing the name will affect inputs in other Switcher Input tables that share the same name. To rename a logical input in this table only, delete the row and insert a new row with the desired

OK   Apply   Close   Print...

Figure 4-3 Jupiter Switcher Input dialog

4. Enter each SH612 input device on a separate row. For each input, enter the physical inputs for each level corresponding to their inputs on the SH612.

For example, the VTR connected to inputs 1 and 2 of the SH612's MADI port 1 has its physical inputs set to 000 and 001 (the Jupiter begins its input count at 000).

NOTE: The first input of MADI port 2 is Jupiter physical input 064, even though the last input of MADI port 1 is Jupiter physical input 055 (SH612 port 1, input 56). This is because the SH612 carries only 56 audio channels per MADI port to reserve bandwidth for Varispeed operation, and the Jupiter assumes it carries the full 64 channels. Thus, make sure to enter the physical inputs properly on the Jupiter when configuring inputs on the SH612's MADI ports: 064 for the first input of MADI port 2, 128 for the first input of MADI port 3, etc.

---

5. When finished entering all inputs, click **Apply** and **Close**.

6. Save the configuration set.

4.2.4   Switcher Output

1. If you have multiple switchers, select **Jupiter->Switcher Output** in the Configurator.

This displays a dialog to choose which switcher to edit.

2. Click the switcher added in Switcher Description above to describe the SH612.

3. Press **OK**.

The Switcher Output dialog opens.

Switcher Output - Euph-SH

	Logical Output Name	Security	S-T	Pass word	Audio L	Audio R	Audio C	Audio LF	Audio Ls	Audio Rs
1	VT01		-		000	001				
2	VT02		-		002	003				
3	VT03		-		004	005				
4	VT04		-		006	007				
5	VT05		-		008	009				
6	HD01		-		010	011	012	013	014	015
7	HD02		-		016	017	018	019	020	021
8	SD01		-		022	023				
9	SD02		-		024	025				
10	SD03		-		026	027				

The name of a logical output. Changing the name will affect outputs in other Switcher Output tables that share the same name. To rename a logical output in this table only, delete the row and insert a new row with the desired name.

OK   Apply   Close   Print...

Figure 4-4 Jupiter Switcher Output dialog

4. Enter each SH612 output device on a separate row. For each output, enter the physical outputs for each level corresponding to their outputs on the SH612.

Note again that outputs start at 000 so output 1 on MADI port 1 is output 000 on the Jupiter and output 1 on MADI port 2 is output 064 on the Jupiter. There are no matching outputs on the SH612 for Jupiter outputs 056–063.

NOTE: *The Security, S-T, and Password settings do not affect the SH612 routing. Check with your Jupiter router system administrator to see if they affect your configuration.*

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5. When finished entering all outputs, click **Apply** and then **Close**.

6. Save the configuration set.

4.2.5   AES/Analog Routing

The SH612 treats all signals as *time-division multiplexed* (TDM) digital signals, which means that any level of any input can be routed to any level of any output. It does not matter if the original was an AES digital or analog signal: The Euphonix input converters (AM713 for analog, DM714 AES), and their corresponding output converters (MA703 and MD704) feed MADI signals to the Studio Hub, which routes them without regard to their original format, source, or destination. Analog sources can be routed to AES destinations, and AES sources to analog destinations. *Thus, separate levels need not be created for AES and analog signals in the Jupiter input and output sets.* We recommend creating levels named *Audio 1* through *Audio 4* (or your highest level number).

4.2.6   Finishing the Configuration

The basic steps for router integration are complete. You may need to create control panel input and output sets or modify your currently existing control panel sets to accommodate the inputs and outputs on the SH612. This is the same as creating Jupiter control panel sets for any other switcher (see the *Jupiter Operations Manual* for more information). When finished, close the Configurator and activate the edited configuration set on your VM3000 board by selecting **JNS Applications->Control Center**.

Before proceeding, verify the routing has been properly implemented. Send audio to some of the SH612's inputs and perform some routes using a Jupiter control panel or the Router Control applet in the JNS Applications tab of the JNS Control Console software.

Chapter 5: Menu Reference and Technical Specifications

5.1   Menu Reference

All menus are depicted but only those parameters that require description are discussed in the submenu sections.

The Main Menu's submenus are listed in this section. Each submenu contains parameters, values, and possibly additional submenus.
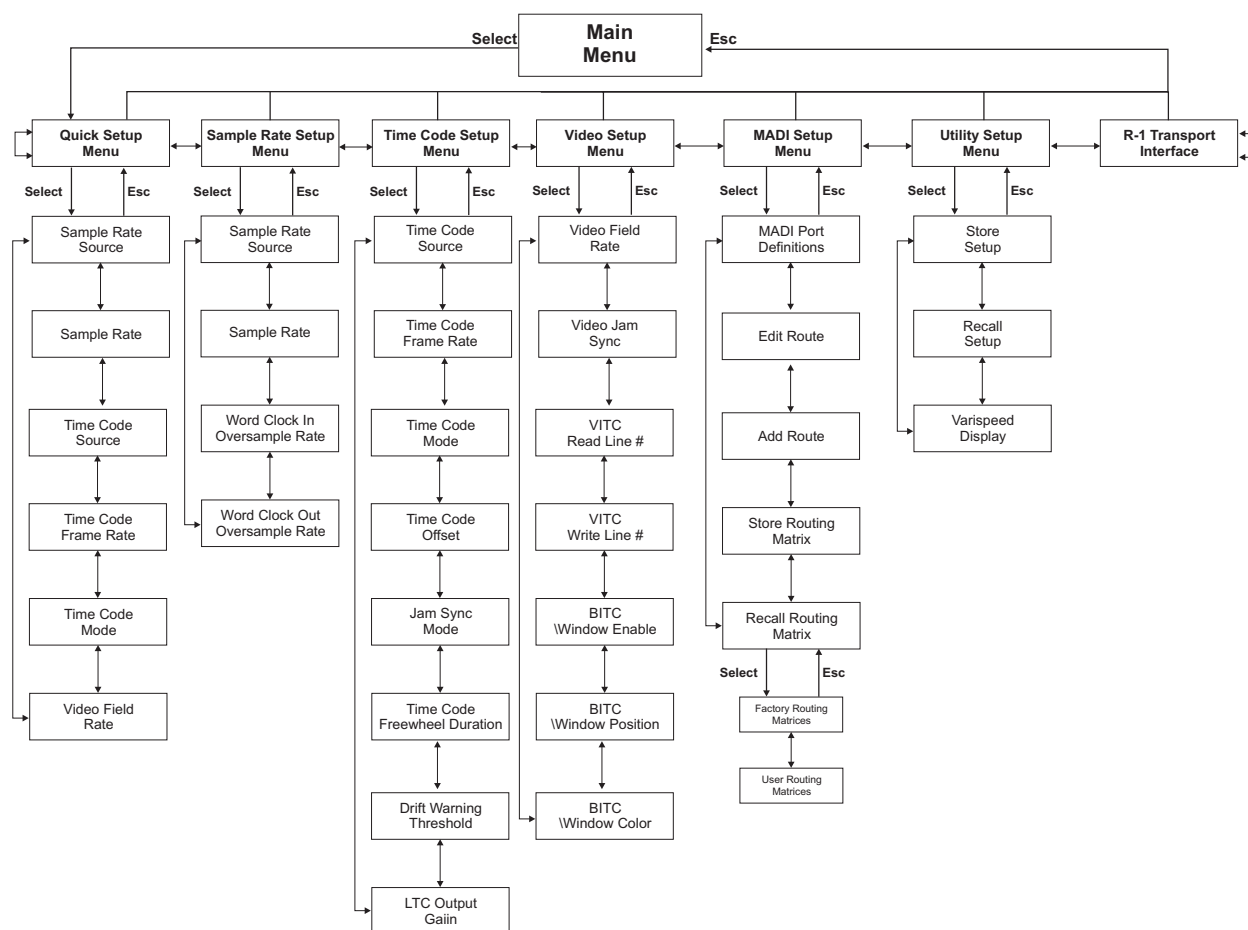

Figure 5-1 Main Menu

5.1.1   Quick Setup Menu

The Quick Setup menu has the most commonly used parameters gathered in one menu for quick and easy access. Refer to the individual menus for explanation of each parameter.
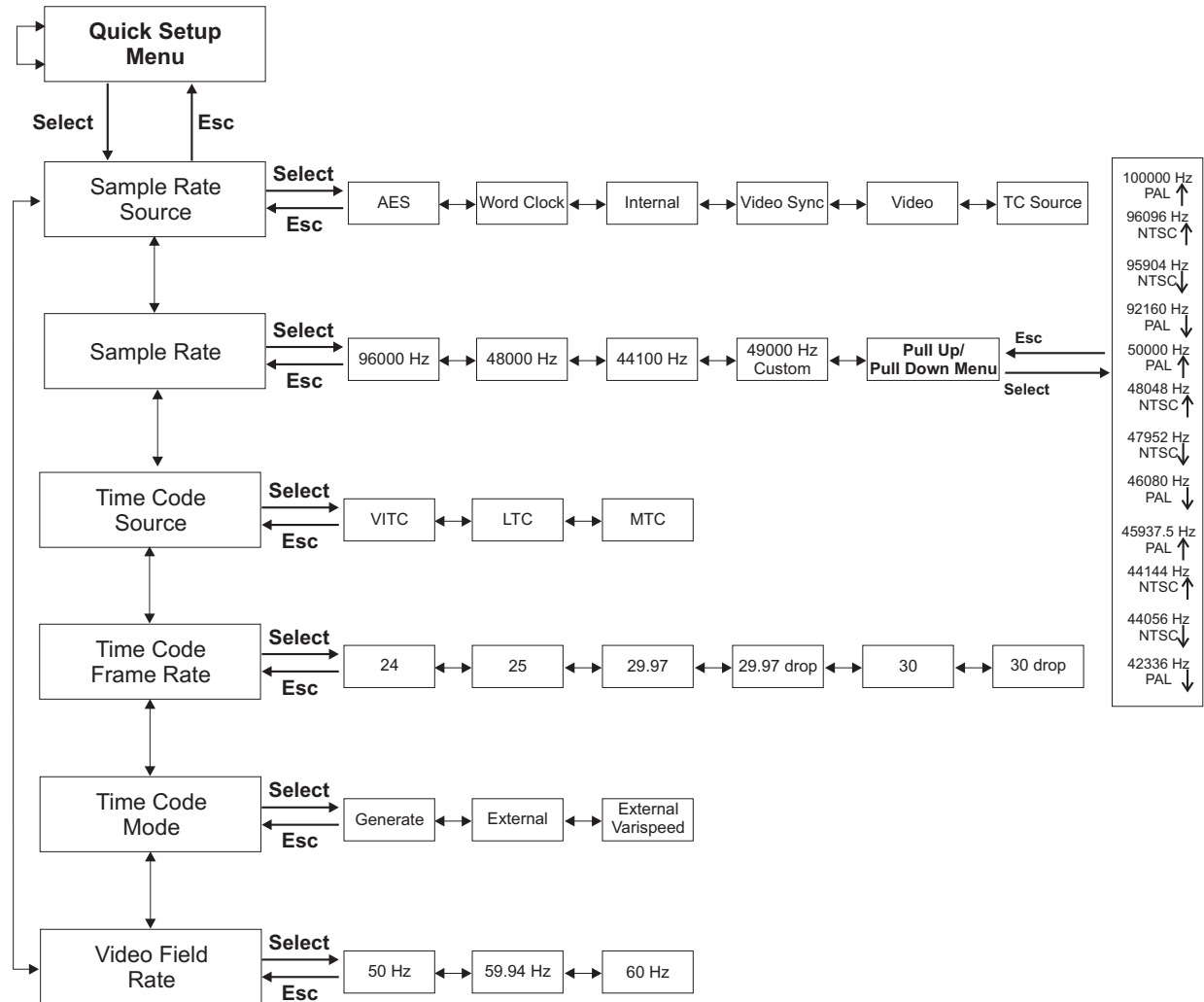
Figure 5-2 Quick Setup Menu

5.1.2   Sample Rate Setup Menu
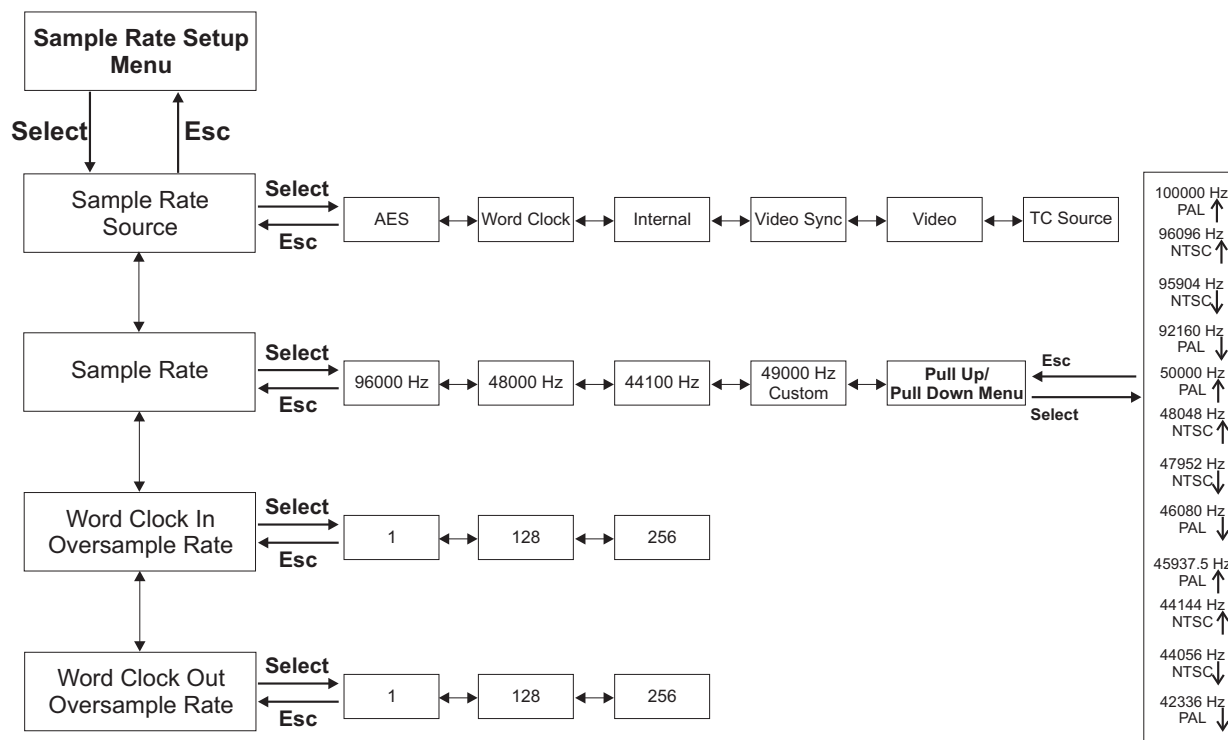
Figure 5-3 Sample Rate Setup Menu

Custom Sample Rate

This parameter allows a user-specified sample rate in the range 31–100 kHz (default value is 49000.0 Hz). To program a Custom sample rate:

1. Use the arrow keys to move the cursor under the sample rate digits.

   Each digit is a separate field.

2. Use the **SpinKnob** to set the sample rate.

3. Press **Select** when the desired sample rate has been set.

   This parameter can also be set in the Quick Setup menu.

Word Clock In Oversample

This feature allows a higher resolution Word Clock input to the SH612. The Word Clock In Oversample value should match the incoming signal. The default is 1 which does not alter the incoming signal and assumes a normal Word Clock sample rate. The other options are 128 and 256 times the incoming rate.

Word Clock Out Oversample

Same options as Word Clock In Oversample.

5.1.3   Time Code Setup Menu

Figure 5-4 Time Code Setup Menu

Time Code Mode

The SH612 has three time code outputs: VITC, LTC, MTC. The time code outputs always represent the current time of the SH612.

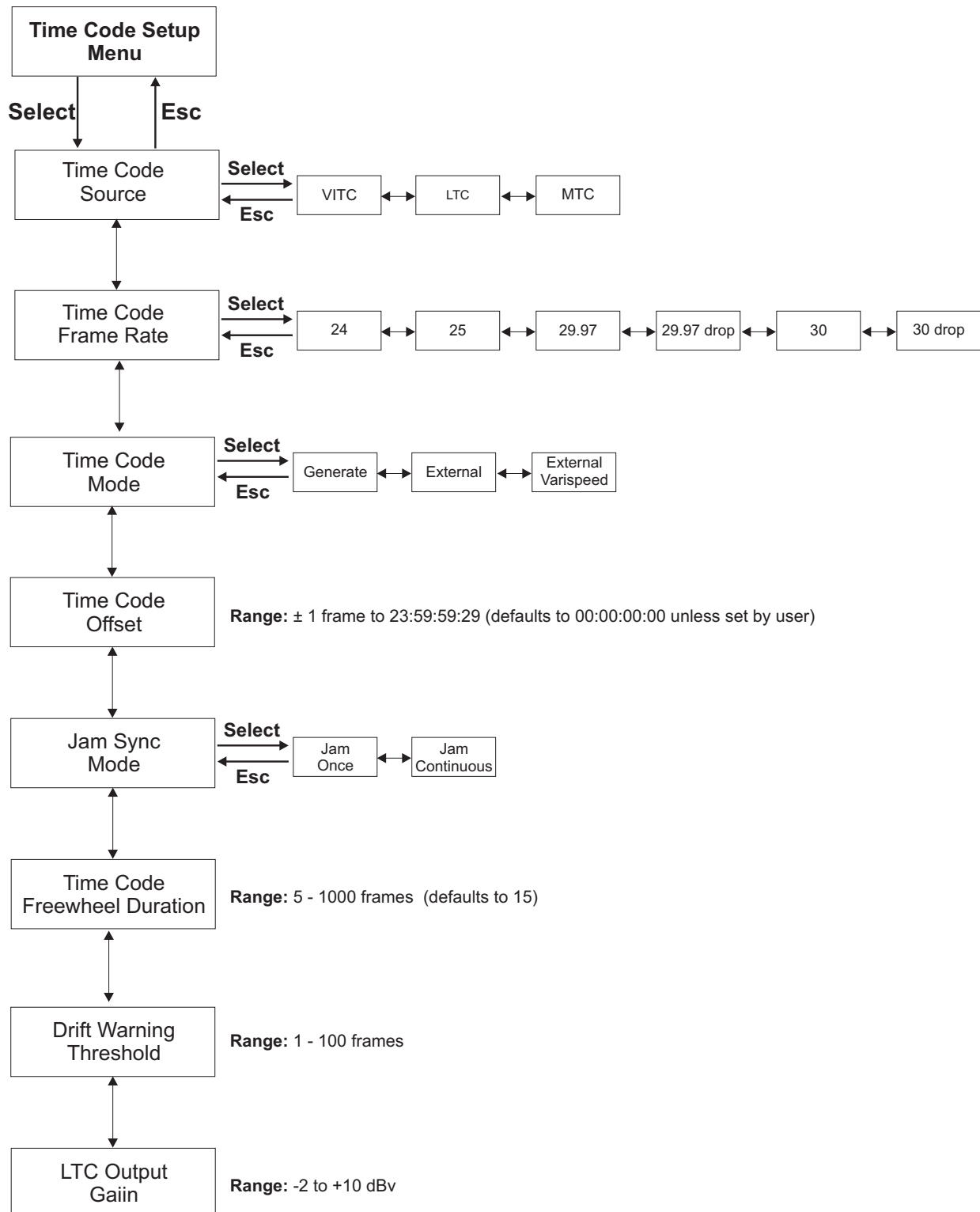**Generate** - This is the default mode for the SH612. Time code is internally generated, routed to the time code outputs, and sample-rate-resolved.

External - With this setting the SH612 is locked to an external time code source and generates the received time code position information at its outputs. This setting corresponds to the **Slave** key on the R-1 Remote.

External Varispeed - This feature is available only on SH612s configured for R-1 systems.

Time Code Offset

Time Code Offset is only relevant when the SH612 is slaved to an external device or an external device is slaved via LTC from the R-1. The R-1 does not output offset Timecode. The Time Code Offset can be positive or negative, and range from 1 frame to 23:59:59:29. A negative offset is subtracted from the Time Code Source value; a positive Offset is added to the Time Code Source value. The equation for Current Time is:

> TC Current Time = TC Source +/- TC Offset

The Time Code Offset defaults to 00:00:00:00 unless specifically set by the user.

To set the offset:

1. Use the left/right arrow keys to position the cursor under each of four double-digit fields.

2. Use the **SpinKnob** to set the desired number.

3. To create a negative offset, position the cursor under the + sign and use the **SpinKnob** to change to the minus sign.

Jam Sync Mode

Jam Once - Locks when time code is first received and runs independent of incoming time code thereafter.

Jam Continuous - Locks continuously to incoming time code and resynchronizes whenever necessary.

Time Code Free Wheel Duration

When the incoming time code signal is interrupted, the SH612 continues to generate time code while it checks for the resumption of incoming time code within the period specified in the **Time Code Freewheel Duration** setting. If the time code source resumes before the **Time Code Freewheel Duration**, the SH612 checks to see if the difference between the current time code source frame value and the time code output frame value is within 1% deviation.

- If the difference is less than or equal to 1%, the SH612 resynchronizes to the new time code source without interrupting time code or sample rate lock.
- If the difference exceeds 1%, the SH612 drops time code and sample rate lock and locks to the new time code position.

Drift Warning Threshold

Specifies the amount of drift that triggers the drift warning (1–100 frames).

LTC Output Gain

Specifies the output level of LTC in the range -2 to +10 dBv.

5.1.4   Video Setup Menu
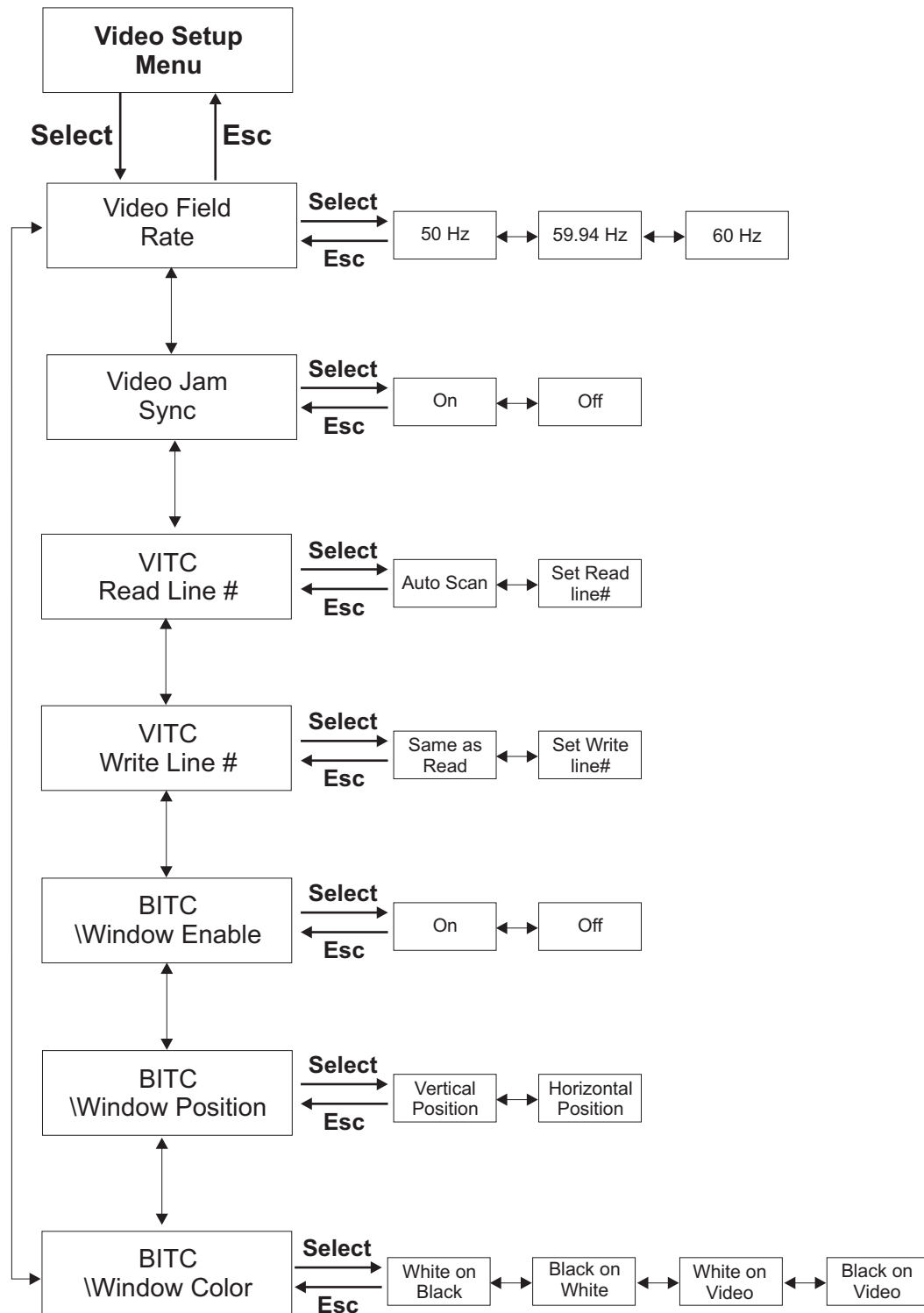
Figure 5-5 Video Setup Menu

Video Jam Sync

On - The SH612 automatically jams the start of the LTC and MTC output frames to be aligned to line 5, field 0 of the blackburst, composite video, or VITC signal.

Off - The time code outputs are not frame-edge aligned with line 5 field 0 of the video source.

VITC Read Line

Auto Scan - Automatically scans for the lines that contain VITC.

Set Read line# - Directed to specific line number combinations in the range 10/12–38/40.

VITC Write Line

Same as Read - Writes to the same lines specified in the **VITC Read Line #** settings.

Set Write Line# - Writes to specific line number combinations in the range 10/12–38/40.

BITC Window Enable

On - Displays a Time Code window on the video monitor.

Off - Does not display a Time Code window.

BITC Window Position

The **Vertical** and **Horizontal** coordinates can be set to position the burn in window.

BITC Window Color

White on Black

Black on White

White on video

Black on Video

5.1.5   MADI Routing Menu

```
┌─────────────────┐
│   MADI Setup    │
│     Menu        │
└─────────────────┘
   Select │  ▲ Esc
          ▼  │
┌─────────────────┐
│   MADI Port     │    Specify each MADI port for Audio Deck (R-1) or non-Audio Deck (System 5) connection
│   Definitions   │
└─────────────────┘
         ▲│
         │▼
┌─────────────────┐
│   Edit Route    │    Implemented only for SH612s configured for the R-1
└─────────────────┘
         ▲│
         │▼
┌─────────────────┐
│   Add Route     │    Routes the MADI In Port to a MADI Out Port
└─────────────────┘
         ▲│
         │▼
┌─────────────────┐
│  Store Routing  │    Stores up to 20 Routes
│     Matrix      │
└─────────────────┘
         ▲│
         │▼
┌─────────────────┐  Select  ┌──────────────┐        ┌──────────────┐
│ Recall Routing  │ ───────▶ │Factory Routing│ ◀────▶ │ User Routing │
│     Matrix      │ ◀─────── │  Matrices    │        │  Matrices    │
└─────────────────┘   Esc    └──────────────┘        └──────────────┘
                          Recalls user or factory Routes
```
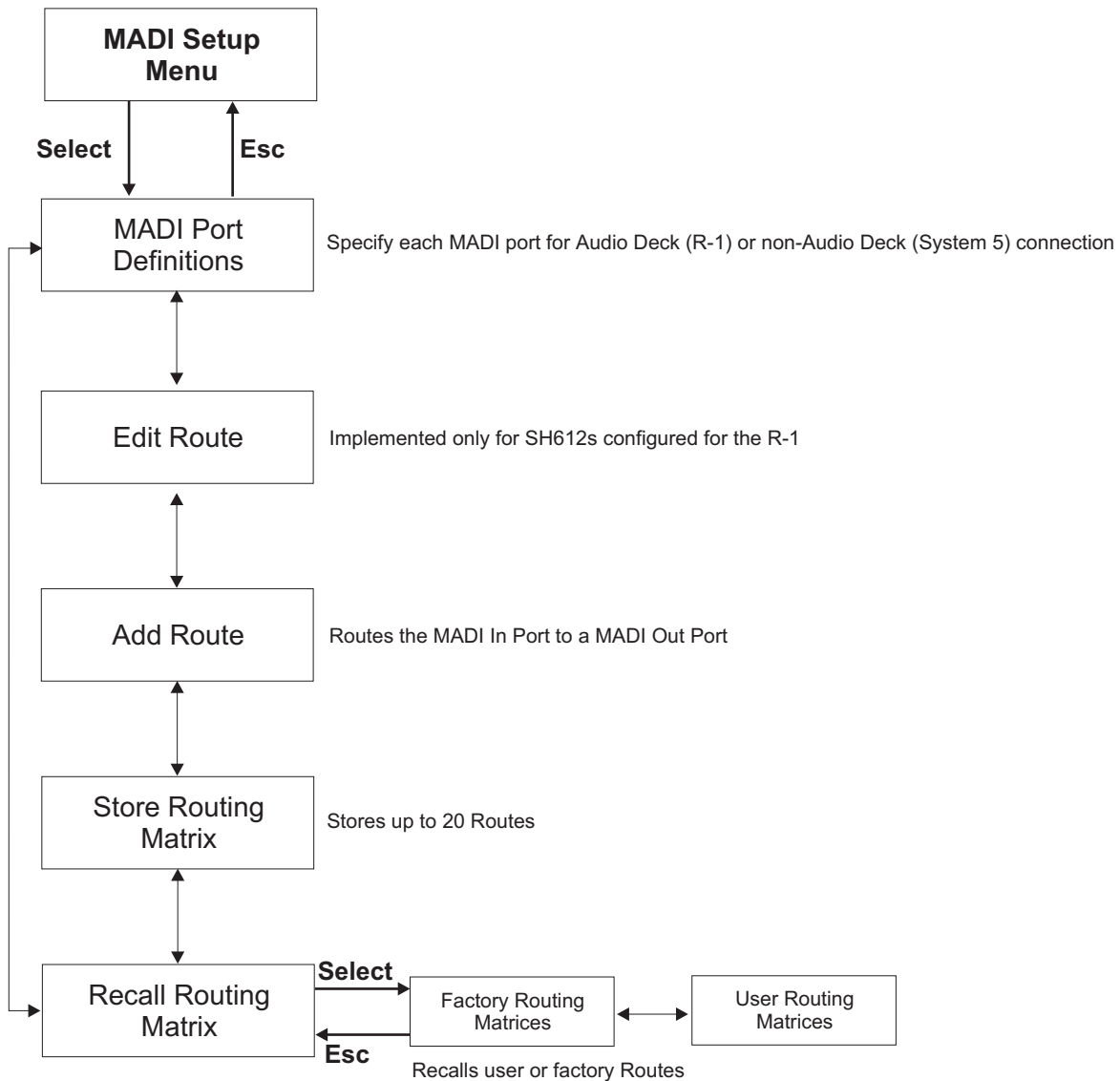
Figure 5-6 MADI Routing Menu

Input channels can be routed to any output channel using the MADI routing menu. A route can consist of entire MADI ports, groups of MADI channels, or a single MADI channel. An individual input can also be routed to one, multiple, or all outputs.

To create a route:

1. Press the MADI port button corresponding to the port to route to or from.

    The **Add Route** submenu appears displaying the input and output ports and channels. You can also locate to the Add Route Menu through the menu system.

    > In: [1: 1 - 56] To Out: [1: 1- 56]

2. Use the arrow keys to move the cursor under the number to adjust and the **SpinKnob** to adjust the number.

3. Press **Select** to finalize the route.

NOTE: *The SH612 does not provide visual confirmation of the active routes so you must check that the route was correct by looking at the meters on the R-1 or System 5 console.*

MADI Port Definitions

This parameter can specify each MADI port for AudioDeck (R-1) or non-AudioDeck (System 5) connections. For the R-1 version 3, the MADI port definitions (AudioDeck vs. non-AudioDeck) are saved as part of a user routing preset and are not Global settings. If you change your port definitions, you need to update existing user presets with the new settings.

Edit Route

Modifies the mapping of MADI input ports to output ports.

Add Route

Press **Select** to display:

> In: [1: 1 - 56] To Out: [1: 1- 56]

Use the arrow keys to move between the In/Out port numbers and the **SpinKnob** to set the port number.

NOTE: *Edit Route, Add Route, Recall Routing Matrix, and Store Routing Matrix are available only for SH612s configured for the R-1. These options are not available for SH612s configured for System 5.*

Store Routing Matrix

Stores up to 20 frequently used custom routes for instant recall.

Recall Routing Matrix

Recalls stored routes. The R-1 default route for sample rates in the range 32–50 kHz is **24 / 144 Track R-1 [56]**; for sample rates over 50 kHz, **R-1 24 / 48 / 96 Track [28]**.

Factory Routing Matrices Menu

- R-1 Through [56]

- Through [56]

- 24–144 Track R-1 [56]

- 3 x 48-Track Splitter/Merger [56]

- S-5 R-1.0

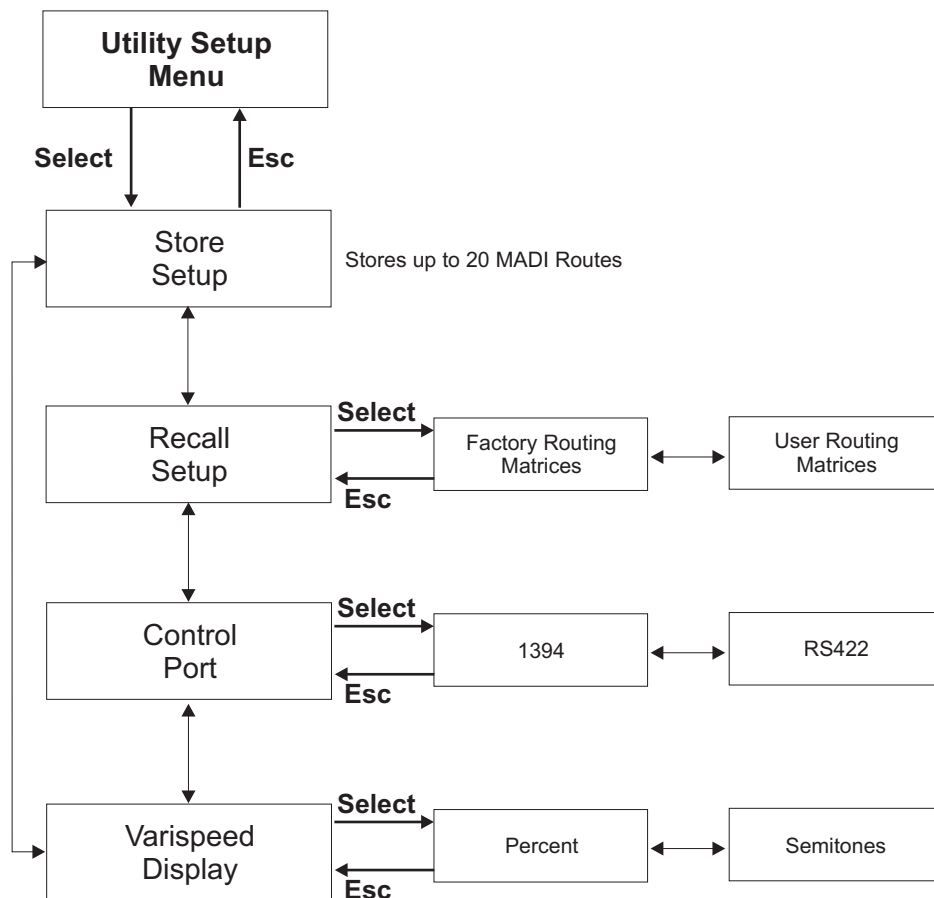- add new patch? discuss above? refer

5.1.6   Utility Menu

Figure 5-7 Utility Menu

Store Setup

Stores all SH612 parameters to one of 20 locations.

Recall Setup

Recalls all parameters from one of 20 locations.

Control Port

This must be set correctly to control the SH612 from the R-1 recorder or System 5 console. The SH612 can be controlled from System 5 from the RS-422 Control port (serial 9-pin connector) or from the R-1 from the IEEE-1394 port. The unit may appear to be disabled if the control port selected here does not match the connected port.

Varispeed Display

Shows the extent to which playback speed is altered.

Percent: -12.5% to + 12.5%

Semitones: -2.32 to + 2.40 semitones

5.1.7   Transport

Used with the R-1, the Transport menu converts the SH612 front panel menu controls into Transport controls. This allows the SH612 to send Machine Control commands to other devices. *This feature is not implemented for use with System 5*.

The R-1 must be set to receive Machine Control commands from the SH612 and Machine Control must be turned on. Two menus provide different controls.

The first menu has:

- **Stop**: Menu marked by a square; controlled by the **Info** button

- **Forward Play**: Menu marked by a single right arrow; controlled by the button with a single, right arrow

- **Reverse Play**: Menu marked by a single left arrow; controlled by the button with a single, left arrow

The second menu has:

- **Stop**: Menu marked by a square; controlled by the **Info** button

- **Forward Shuttle**: Menu marked by a double, right arrow; controlled by the button with a single, right arrow

- **Reverse Shuttle**: Menu marked by a double, left arrow; controlled by the button with a single, left arrow

In the top of each menu the time and play/ stop /shuttle status is shown.

5.2   SH612 Technical Specifications

SH612 Technical Specifications	
Synchronization	
Inputs	Word Clock, AES, Internal, NTSC/PAL blackburst and composite video, Time Code
Word Clock Oversample Rate	1 BNC; 1x, 2x, 128x, and 256x
AES	1 female XLR
Internal Sample Rate	44.1, 48, 96 kHz ±10 ppm custom sample rates: 31–100 kHz
Video Sync Video	Two BNC connectors (NTSC/PAL blackburst or composite, VITC) 1 V peak-to-peak (75 Ω termination)
Video Frame Rates	50 Hz, 59.94 Hz, 60 Hz
External Sample Rate Range	**Input Source = Word or AES:** 31–100 kHz **Input Source = Video, Video Sync, Time Code:** selected sample rate ±1%
Outputs	Word Clock, AES, AES Thru
Word Clock Oversample Rate	1 BNC; 1x, 2x, 128x, and 256x
AES	4 male XLR
AES Thru	1 male XLR
Time Code	
Inputs	LTC (¼" phono or female XLR), VITC (BNC), MTC (5-pin DIN)
Outputs	LTC (¼" phono or male XLR), VITC (BNC), MTC (5-pin DIN)
Frame Rates	24 fps, 25 fps, 29.97 fps (drop and non), 30 fps (drop and non)
MADI	12 in x 12 out; 24-bit signal path; BNC 75 Ω (inputs and outputs)
Inputs Outputs	56-channel with nominal sample rates (31 and 50 kHz) 28-channel with sample rate > 50 kHz
Control	
Machine Control Inputs	9-pin RS-422, 5-pin DIN MMC In
IEE1394	3 ports
Dimensions	
Size	3.5" (9 cm) x 19" (49 cm) x 18.5" (47 cm)
Weight	12 lb (5.5 kg)
Miscellaneous	
Power Requirements	110–240 V, 50–60 Hz (autoranging)
Power Consumption	100 W
Operating Temperature	5–35ºC (41–95ºF)